

Experimental Challenge of Healthy Adults with *Cryptosporidium hominis* (Genotype 1)

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Cryptosporidium parvum causes diarrheal illness worldwide and is associated with waterborne transmission. Molecular studies have identified two distinct genotypes with different transmission cycles. Genotype 1 (G1) strains are primarily a human-to-human transmission, while genotype 2 (G2) strains are zoonotic. Previous dose response studies in healthy adults employed five genotype 2 isolates, which varied widely in infectivity, yielding ID₅₀'s between 9 and 1042 oocysts. This study is a progress report of experimental G1 infections in healthy adults. The G1 isolate (TU502) used in this study originated from a human case and was amplified in gnotobiotic piglets. A single dose (10, 30, 100 or 500 oocysts) of TU502 was administered to 16 volunteers, which were then monitored for six weeks. Results showed that the TU502 ID₅₀ was similar to the most infectious of the G2 isolates. The onset of diarrhea and oocyst shedding following TU502 challenge were similar to the G2 isolates; however, the duration of diarrhea and oocyst shedding showed important differences. The typical 4-7 days of diarrhea seen with G2 isolates was prolonged in TU502 volunteers, lasting up to 22 days. Further, 83% of volunteers challenged with the G2 isolates cleared their oocysts by 14 days compared to 60% of volunteers receiving TU502. Two subjects shed for 24 and 35 days, respectively. Total oocysts shed per person ranged from 5 X 10⁶ to 1 X 10¹⁰, the latter occurring in the volunteer with the longest episode of diarrhea and oocyst shedding. These data suggest that the G1 isolate, TU502, was highly infectious in healthy adults and was associated with a longer diarrheal illness followed by an extended period of oocyst shedding. These characteristics suggest a high risk of infection from environmental sources and a risk of secondary transmission from contact with symptomatic and asymptomatic oocyst shedders. These findings are consistent with the high proportion of G1 isolates associated with outbreaks of human cryptosporidiosis. These data are useful for risk assessment and setting water quality standards.